

IRINA MARSHAKOVA-SHAIKEVICH

## Rankings of Russian and Polish Universities: an Analysis of Webometric Indicators

**Abstrakt (Rankingi rosyjskich i polskich uniwersytetów: analiza wskaźników webometrycznych).** W artykule przedstawiono webometryczne wskaźniki polskich oraz rosyjskich uczelni wyższych w rankingu 5000 uniwersytetów światowych. Pokazano web-wskaźniki wprowadzone przez laboratorium grupy CINDOC w Madrycie i sposób wyliczania webometrycznego rankingu uczelni wyższej. Wyniki badań pokazują, że polskie i rosyjskie uczelnie wyższe zajmują niską pozycję w rankingu wyższych szkół świata w latach 2005–2009.

**Abstract.** The article presents the webometrics ratings of Russian and Polish institutions of higher education in the ranking listing of 5000 world universities. The web activity indicators developed by CINDOC group in Madrid are shown and the method of calculating a webometric rating of a higher education institution is demonstrated. The research results show that Russian and Polish universities occupy a low position in the ranking lists for years 2005–2009.

### Introduction

As we know, World Wide Web (WWW) draws attention of specialists engaged in various fields of activities. It is of prime importance to educators and researchers. This paper presents the webometric ratings of Russian and Polish institutions of higher education in the ranking listing of 5000 world universities

It was at CINDOC laboratory of Spanish Center of Scientific Research (CSIC) that a method of calculating webometrics ranks (WRs) was developed and later applied to monitoring web activities of world universities (Aguillo et al. 2005). These web activity indicators are used in this study, the method of their calculation widely known in bibliometrics and webometrics.

The objective of this study was to analyze the web-indicators presented in the web-rankings of Russian and Polish universities on the CINDOC website in years 2007–2009.

## Methodology

The CINDOC calculation of webometrics rank (WR) is based on four parameters:

**Size (S)** – number of pages recovered from Google, Yahoo, Live Search and Exalead.

**Visibility (V)** – number of unique external links received (in-links).

**Rich Files (R)** – volume of different file formats: Adobe Acrobat (.pdf), Adobe PostScript (.ps), Microsoft Word (.doc) and Microsoft Powerpoint (.ppt)

**Scholar (Sc)** – number of papers and citations for each academic domain (according to Google Scholar).

For each of the four parameters, a list of universities is produced, with ranks (R) growing from top to bottom. The resulting webometrics rank (WR) is calculated according to the formula:

$$WR = 0,5 RankV + 0,2 RankS + 0,15 Rank R + 0,15 Rank Sc$$

Or 
$$WR = 0,5V + 0,2S + 0,15 R + 0,15 Sc$$

## Ratings of world universities

The 2004 webometric rating of world universities included 500 universities from 15 countries. At present, the figures are much higher – more than 14 thousand universities from 191 countries. Table 1 presents the corresponding statistics for 2007–2009.

Table 1. Number of universities according to region and country

Regions / Countries	Number of countries	Total number of Higher Education Institutions (Domains)
Europe	<b>52</b>	<b>4216</b>
France		630
Russia		490
Germany		377
UK		228
North America	<b>6</b>	<b>3545</b>
USA		3348
Asia	<b>44</b>	<b>3692</b>
China		891
Japan		671
India		326
Latin America	<b>33</b>	<b>2806</b>
Brazil		1576
Mexico		341
Africa	<b>47</b>	<b>516</b>
Oceania	<b>9</b>	<b>101</b>
Total	<b>191</b>	<b>14875</b>

Table 2. Rating of European universities: 2007

Rank		Higher Education Institutions	Position			
Europe	World		Size	Visibility	Rich Files	Scholar
1	21	University of Cambridge	16	25	62	77
2	40	University of Oxford	59	40	44	93
3	41	Swiss Federal Institute of Technology Zurich	13	71	57	51
4	44	University of Helsinki	45	65	28	65
5	45	University of Edinburgh	63	59	53	41
6	46	University of Oslo	41	58	24	137
7	55	University College London	109	48	83	113
8	62	Linköping University (Sweden)	25	98	107	114
9	64	Universität Trier (Germany)	28	39	419	72
10	67	Universität Wien	50	88	85	180
11	74	Royal Institute of Technology (Sweden)	54	128	87	88
12	76	Norwegian University of Science & Technology	85	143	46	39
13	77	Utrecht University (Netherlands)	140	118	61	16
14	80	Technische Universität Chemnitz (Germany)	69	38	235	320
15	81	Université De Geneve	114	95	136	127
16	82	Freie Universität Berlin	91	124	170	30
17	91	Uppsala University (Sweden)	86	168	77	57
18	93	Technische Universität Wien	39	150	184	123
19	97	Technische Universität Berlin	29	179	106	109
20	99	Aarhus University (Denmark)	147	76	156	246
21	102	University Of Southampton (Uk)	141	147	121	21
22	104	Universität Hamburg	76	177	135	42
23	105	Universität Leipzig	77	146	101	210
24	107	University of Amsterdam	126	138	124	124
25	107	University of Glasgow	74	101	263	237
Eastern European Universities						
1	107	Charles University (Czech Rep.)	65	173	35	213
2	129	Lomonosov Moscow State University	221	66	432	151
3	205	Masaryk University (Czech Rep.)	197	375	86	12
7	315	University of Belgrade	246	515	370	21
22	688	Technical University Ostrava	652	1202	477	15

American universities are invariably at the top of the world ranking lists. Among 30 leading universities, as of January 2009, there are only two outside USA: Toronto 24<sup>th</sup> on the list and Cambridge 28<sup>th</sup> on the list. The contribution of non-US universities is evident on the list of top 100 institutions ('Premier League') with 8 universities from Canada, 6 – from UK, 2 – from Japan, and from Switzerland, Norway, Sweden,

Table 3. Webometric indicators of Russian universities: January 2009

Ranks		Russian Higher Education Institutions	Position			
RU	World		Size	Visibility	Rich files	Scholar
1	186	Lomonosov Moscow State University	328	168	366	149
2	927	Saint Petersburg State University	1252	1227	601	855
3	949	Novosibirsk State University	874	1200	1004	1224
4	1143	State University Higher School of Economics (Moscow)	523	1888	1143	673
5	1219	Moscow Institute of Physics and Technology	699	1459	1649	1920
6	1279	Tomsk State University	913	1844	1635	851
7	1556	Bauman Moscow State Technical University	1319	1698	2689	1971
8	1624	Saint Petersburg State Institute of Fine Mechanics and Optics	1248	2728	1125	773
9	1648	Altai State University	1562	2555	1860	381
10	1702	Kazan State University	1854	2646	1417	602
11	1821	Ural State University	2246	2710	1385	687
12	1846	Russian State University for the Humanities	1711	2046	3602	1689
13	1884	Saratov State University	1402	2639	2549	1431
14	1951	Moscow State Engineering Physics Institute	1325	3590	1153	331
15	1986	Far Eastern State University (Russian)	1169	2718	2986	1835
16	2033	Krasnoyarsk State University	2100	2577	3580	885
17	2086	Tomsk Polytechnic University	1692	3237	1728	1393
18	2109	Southern Ural State University	1763	2428	3923	1962
19	2135	Moscow State Institute of International Relations	1789	3139	2840	865
20	2218	Peoples' Friendship University of Russia	5279	1145	5102	1345
21	2377	Udmurt State University	2065	3503	3311	803
22	2469	Tambov State Technical University	2423	3900	1770	1109
23	2566	Novosibirsk State Technical University	1736	4110	1517	2266
24	2572	Moscow State University of Economics Statistics and Informatics	996	3612	3061	3405
25	2579	Southern Federal University (Rostov State University)	4199	2708	2905	2331
26	2625	Voronezh State University	2053	4415	2165	564
27	2632	Nizhny Novgorod State University	2269	4279	2366	600
28	2679	Russian Academy of State Administration	2523	3314	3361	2814
29	2733	Chelyabinsk State University	2867	4323	2213	539
30	2741	Moscow Aviation Institute (University of Aerospace Technology)	3348	3152	4517	1524

Finland, Netherlands, Belgium, Germany, Italy, Mexico, Brazil, Australia, Taiwan – one university each (Marshakova-Shaikovich 2009b).

The rankings of 25 European universities are given in Table 2. There, one finds European and world integral webometric ranks as well as the world ranks of the constituent parameters enumerated above. The absence of East European universities is manifested: Moscow State University is 43d and Polish leader (Warsaw University of Technology) is 186<sup>th</sup> on the European list.

A word of caution should be expressed here. The fourth parameter (Scholar) behaves in a very peculiar way. It is strange to find the University of Southampton (world rank 102, Scholar parameter 21) much higher on the list than Cambridge (21, 77), Oxford (40, 93) or Edinburgh (45, 41). The same doubt could arise in case of Masaryk U. (world rank 205, Scholar 12), Technical U. of Ostrava (688, 15) and U. of Belgrade (315, 21) as European leaders, or Altai State U. coming 3rd among Russian universities (Table 5). Are these outright mistakes? Or is something wrong with the methodology itself? The fourth parameter has a factor of 0.15, and does not influence radically the integral webometric rank. It seems safer to drop this parameter altogether and return to the practice from 2006, keeping only three parameters. The resulting webometrics rank, as a measure of involvement in WWW (World Wide Web), would be more lucid, and no attempt could be made to measure the quality of scientific output.

Table 4. Webometric indicators of 17 Polish universities: 2007 and 2009

2007		Polish Higher Education Institutions	2009		
Rank in Poland	World Rank		Rank in Poland	European Rank	World Rank
3	500	Jagiellonian University	1	179	417
2	465	AGH University of Science & Technology	2	230	511
1	439	Warsaw University of Technology	3	231	512
5	566	Wroclaw University of Technology	4	259	578
4	559	Warsaw University	5	275	634
6	630	Adam Mickiewicz University Poznan	6	281	654
7	742	Wroclaw University	7	283	662
9	811	Gdansk University of Technology	8	309	726
18*	1282	University of Silesia	9*	341	796
10	895	Marie Curie-Skłodowska University	10	342	801
16	1189	Technical University of Lodz	11	381	925
8	808	Gdansk University	12	402	974
14	1098	Nicolaus Copernic Univ	13	411	994
11	975	Faculty of Mathematics, Informatics & Mechanics Warsaw University	14	449	1125
31*	2240	University of Lodz	15*	453	1135
12	980	Warsaw School of Economics	16	458	1145
14	1143	Poznan University of Technology	17	495	1256

### Rating of Russian and Polish universities: Jan 2009

Webometrics rating of January 2009 was based on the list of 14 thousand world universities, among them 490 Russian universities, which constitute 3.5% of the total number. Their ranking is low: there are only 100 Russian universities (2%) on the top 5000 list, and only one – Moscow State University – on the top 200 list (0.5%). Five

Table 5. Webometric ranks in constituent parameters within 30 Russian universities: 2009

Rank Visibility	Russian Higher Education Institutions	Position in Russia		
		Size	Rich files	Scholar
1	Lomonosov Moscow State University	1	1	1
2*	Peoples' Friendship University of Russia	30	30	18
3	Novosibirsk State University	4	3	17
4	Saint Petersburg State University	9	2	13
5	Moscow Institute of Physics and Technology	3	11	24
6	Bauman Moscow State Technical University	10	19	26
7	Tomsk State University	5	10	12
8	State University Higher School of Economics	2	5	8
9	Russian State University for the Humanities	15	27	22
10	Southern Ural State University	17	28	25
11*	Altai State University	13	14	3
12	Krasnoyarsk State University	22	26	15
13	Saratov State University	12	18	20
14	Kazan State University	19	8	7
15	Southern Federal University (Rostov State University)	29	21	28
16	Ural State University	23	7	9
17	Far Eastern State University (Vladivostok)	7	22	23
18	Saint Petersburg State Institute of Fine Mechanics and Optics	8	4	10
19	Moscow State Institute of International Relations	18	20	14
20	Moscow Aviation Institute (University of Aerospace Technology)	28	29	21
21	Tomsk Polytechnic University	14	12	19
22	Russian Academy of State Administration	26	25	29
23	Udmurt State University	21	24	11
24	Moscow State Engineering Physics Institute	11	6	2
25	Moscow State University of Economics Statistics and Informatics	6	23	30
26	Tambov State Technical University	25	13	16
27	Novosibirsk State Technical University	16	9	27
28	Nyzhny Novgorod State University	24	17	6
29	Chelyabinsk State University	27	16	4
30	Voronezh State University	20	15	5

Table 6. Presents the webometric ranks in constituent parameters within 30 Polish universities

Rank in Poland	Word Rank	Polish Higher Education Institutions	Position in Poland		
			Visibility	Scholar	Size
1	417	Jagiellonian University	<b>2</b>	<b>2</b>	<b>4</b>
2	511	AGH University of Science & Technology	<b>4</b>	<b>3</b>	<b>1</b>
3	512	Warsaw University of Technology	<b>1</b>	9	6
4	578	Wroclaw University of Technology	9	<b>1</b>	<b>3</b>
5	634	Warsaw University	<b>3</b>	<b>4</b>	12
6	654	Adam Mickiewicz University Poznan	<b>6</b>	<b>8</b>	10
7	662	Wroclaw University	10	<b>5</b>	<b>7</b>
8	726	Gdansk University of Technology	8	14	5
9	796	University of Silesia	<b>5</b>	11	14
10	801	Marie Curie-Skłodowska University	7	17	15
11	925	Technical University of Lodz	12	13	9
12	974	Gdansk University	13	20	11
13	994	Nicolaus Copernic University	15	21	<b>2</b>
14	1125	Faculty of Math, Informatics & Mechanics Warsaw Univ	18	16	13
15	1135	University of Lodz	18	<b>7</b>	8
16	1145	Warsaw School of Economics	14	24	16
17	1256	Poznan University of Technology	17	15	21
18	1308	Faculty of Physics Warsaw University	21	19	19
19	1448	Silesian University of Technology Gliwice	24	<b>10</b>	17
20	1508	Cracow University of Technology	<b>16</b>	23	20
22	1701	University of Zielona Góra	27	<b>6</b>	18
25	2064	University of Warmia and Mazury	25	18	26
29	2401	Medical University of Wroclaw	30	<b>12</b>	25
30	2474	Wyższa Szkoła Biznesu National Louis University N Sącz	<b>11</b>	30	30

universities lag much behind, with positions between 900 and 1300: these are Saint-Petersburg U., Novosibirsk U., Higher School of Economics, Moscow Institute of Physics and Technology, Tomsk U.

The Webometric indicators of Russian universities are presented in Table 3, the webometric indicators of 17 Polish universities are presented in Table 4.

Unlike in Russia, web indicators in Poland are distributed very evenly, without any breaks between groups. The results of 2009 rating do not differ significantly from those of 2007. One major exception is the spectacular rise of the University of Lodz, whose world rank in 2007 was 2240, and in 2009 it is 1135, so it has moved from the 31<sup>st</sup> to 15<sup>th</sup> position on the Polish list. To some extent, the same is true for the University of Silesia, which has moved from 18<sup>th</sup> to 9<sup>th</sup> position on the Polish list. (For more about the rating of Polish universities in 2007 see: Marszakowa-Szajkiewicz 2009a: 244–246).

Tables 2, 3, and 4 present ample evidence of great discrepancies between the four constituent parameters. Separate ranks for each parameter within one country make this fact even clearer. This is shown in Tables 5 and 6 (which are transformations of Tables 3 and 4)

The anomalous position of Peoples' Friendship University of Russia is quite clear: it is second in Visibility, 18<sup>th</sup> in Scholar and 30<sup>th</sup> (the last!) in Size and Rich Files. Aimed at foreign students (mostly from developing countries), the university has to promote visibility by all possible means, which explains the above-mentioned anomaly.

## Conclusions

1. The universities of the two countries considered in this paper, differ very much in their involvement in WWW (see Table 7). Poland keeps abreast with the general progress of web technologies, the number of its universities on the top 2000 and the

Table 7. Poland and Russia in webometric top lists

Year	Country	Top 1000	Top 2000	Top 4000
2007	Poland	5	24	69
	Russia	5	24	91
2009	Poland	13	24	66
	Russia	3	15	70

top 4000 lists remains stable. More than that – their number on top 1000 list is growing. The number of Russian universities on all three lists is decreasing considerably.

The Rating of Eastern European universities in 2008 included 25 Polish and 20 Russian universities; in 2009 July the figures are 20 and 11 (Marshakova-Shaikovich, 2009b).

2. The inner structure of academic community is also different. Russia has one outstanding university – Moscow State Univ., which is on the top 200 list, a group of five other universities on the verge of the top 1000 list and other remaining universities. There are no clear-cut groups among Polish universities. This difference in structure affects not only a webometrics rating, but also a general academic output, as corroborated by Leiden rating for Europe 2000–2007 (see Table 8).

The general number of publications of the two Russian universities (with Moscow U. producing 75% of the sum) is approximately the same as the combined output of six Polish universities.

Quantitatively, Russia and Poland seem to be on a par with each other as far as webometric and bibliometric rating is concerned (with Poland showing better dynamics). The fact is astonishing in a view of the countries' disparity in size and (sheer) number of students.



Table 8. The publications of Polish and Russian Universities: 2000–2007

European rank 2000–2007	Country	University	No. of publications
14	RU	Lomonosov Moscow State University	23,554
128	PL	Jagiellonian University Krakow	7,670
133	RU	St Petersburg State University	7,504
137	PL	Warsaw University	7,223
221	PL	Adam Mickiewicz University Poznan	4,370
232	PL	Wroclaw University	4,037
245	PL	Warsaw University of Technology	3,725
249	PL	Wroclaw University of Technology	3,671

3. A few words in conclusion. The webometric rating developed by the CINDOC laboratory reflects universities' involvement on the Internet, connected to some extent with the academic faculty's activity. Information technology was measured by three constituent parameters (Size, Visibility, Rich Files). The Visibility parameter (number of in-links of the site) was assigned the greatest weight in the integral rating. The fourth parameter (Scholar) is aimed at measuring an academic activity and numerically stands apart in our tables.

## LITERATURE

- Aguillo I., Granadino B., Ortega J.L., Prieto J.A., 2005: What the Internet says about Science: Universities can be ranked based on web indicators. *Scientist*, V.19, I s. 14, p. 10 (Jul. 18, 2005).
- Marszakowa-Szajkiewicz I., 2009a: *Badania ilościowe nauki: podejście bibliometryczne i webometryczne*. UAM, Poznań, 2009, 292 ss.
- Marshakova-Shaikevich I., 2009b: Webometric assessment of Russian and Polish universities. *Proceedings of Fifth International Conference on WIS & Tenth COLLNET Meeting*, 13-16 September 2009, Dalian, China. [http://www.cwts.nl/ranking/Leiden\\_Ranking\\_WebSite.html](http://www.cwts.nl/ranking/Leiden_Ranking_WebSite.html)